



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,345	07/08/2003	Masaaki Kurihara	DAIN:740	7853

25944 7590 11/30/2006

OLIFF & BERRIDGE, PLC
P.O. BOX 19928
ALEXANDRIA, VA 22320

EXAMINER

RUGGLES, JOHN S

ART UNIT	PAPER NUMBER
----------	--------------

1756

DATE MAILED: 11/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/614,345

Applicant(s)

KURIHARA ET AL.

Examiner

John Ruggles

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-8 and 10-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) none is/are allowed.
- 6) ☒ Claim(s) 1,4-8 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed on 10/24/06 in this application after the previous 5/30/06 final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous 5/30/06 Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' previous submission filed on 9/14/06 has now been entered.

Response to Amendment

In the currently entered previous submission filed on 9/14/06, claims 1 and 7 have been currently amended, claims 2-3, 9, and 13-14 have now been cancelled, and claims 4-6, 8, and 10-12 remain as previously presented. Therefore, only claims 1, 4-8, and 10-12, as currently amended, remain under consideration.

The previous specifically exemplified objections to the specification numbered (4)-(6) are withdrawn in view of current amendments and accompanying remarks, but further reasons for objection to the specification are set forth below.

The previous objections numbered (1)-(2) of claims 1 and 3-12 are withdrawn in view of the currently entered amendments and accompanying remarks, as stated below.

The previous rejection under the second paragraph of 35 U.S.C. 112 is maintained below in revised form, as necessitated by the currently entered claim amendments.

Art Unit: 1756

The previous prior art rejections under 35 U.S.C. 103(a) are maintained below in revised form over the same prior art references already of record, as necessitated by current claim amendments.

New nonstatutory obviousness-type double patenting (ODP) rejections are presented below.

Applicants' currently entered amendments and accompanying arguments with respect to claims 1, 4-8, and 10-12 have been fully considered, but they are either moot or unpersuasive in view of the new and maintained ground(s) of rejection (in which revisions to the maintained grounds of rejection emphasize some portions thereof, as necessitated by the currently entered amendment), as stated below.

Specification

The previous specifically exemplified objections to the specification numbered (4)-(6) are withdrawn in view of current amendments and accompanying remarks, but further reasons for objection to the specification are set forth below.

The title of the invention is not descriptive of only the remaining claims. A new title is required that is clearly indicative of the invention to which the remaining claims are directed.

The following title is suggested: --PHASE MASK FOR FORMING A DIFFRACTION GRATING[[],] AND METHOD OF FABRICATING THE PHASE MASK[[],] ~~AND METHOD OF FORMING DIFFRACTION GRATING--~~.

The disclosure is still objected to because of at least the following informalities: (7) at page 7 line 33, "the duty ration" should be corrected to --the duty ratio[[n]]--, as previously defined in the specification at page 7 lines 27-29; (8) at page 11 lines 18-19, "successive steps of

Art Unit: 1756

a phase mask fabricating method of fabricating the phase mask" is repetitive and should be shortened to --successive steps of a phase mask fabricating method of fabricating the phase mask--; and (9) at page 12 line 9, "the transparent substrate" should be changed to --[[the]] a transparent substrate--.

Appropriate correction is again required. An amendment filed making all appropriate corrections must be accompanied by a statement that the amendment contains no new matter and also by a brief description specifically pointing out which portion of the original specification provides support for each of these corrections.

Claim Objections

The previous objections numbered (1)-(2) of claims 1 and 3-12 are withdrawn in view of the currently entered amendments and accompanying remarks.

Claim Rejections - 35 USC § 112

The previous rejection under the second paragraph of 35 USC 112 is maintained below in revised form, as necessitated by the currently entered claim amendments.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-8, and 10-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In each of claim 1 line 12 and claim 7 line 16, the exact meaning of "apodization exposure" is still unclear. Page 3 lines 18-23 of the specification state, in part, "the irradiation method (line 18)...through a phase mask to form a diffraction grating (lines 20-21)...needs to

Art Unit: 1756

carry out apodization to modulate the refractive index of the optical fiber axially (lines 21-23)". For the purpose of this Office action and in order to advance the prosecution of this application, the above statement from the specification is understood to suggest that "apodization exposure" was *intended to* --modulate or change the refractive index by selective exposure through a phase mask having a plurality of grooves-- (e.g., to form a diffraction grating in an optical fiber or optical waveguide, etc.). Nevertheless, Applicants are apprised that recitations directed to the manner in which the phase mask is intended to be used do not distinguish the instant claims to a phase mask or methods of fabricating phase masks from those of the prior art (otherwise having the same actual structural phase mask limitations or the same positively recited steps of fabricating phase masks), when the prior art has the capability to so perform. See MPEP § 2114 and *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Furthermore, "the recitation of a new intended use for an old product does not make a claim to that old product patentable", *In re Schreiber*, 44 USPQ2d 1429 (Fed. Cir. 1997). Claims 4-6 depend on claim 1 and claims 8 and 10-12 depend on claim 7.

Claim Rejections - 35 USC § 103

The previous prior art rejections under 35 U.S.C. 103(a) are maintained below in revised form over the same prior art references already of record, as necessitated by current claim amendments.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-8, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Segawa et al. (US 6,214,495) in view of Inoue et al. (US 6,251,544).

Segawa et al. '495 teach a phase mask (phase shift mask, PSM) for patterning an optical fiber and a method of manufacturing the phase mask (PSM, title, abstract). Figure 2(b) shows the phase mask 21 having a surface of alternating grooves 26 and strips 27 for making a Bragg diffraction grating in an optical fiber (col. 4 lines 53-55, which also reads on an optical waveguide and an optical guide, *instant claims 5, 6, 11, and 12*). The phase mask (PSM) parallel groove pitch is varied in the range of 0.85-1.25 μm (col. 3 lines 25-26 and col. 4 lines 1-3, which encompasses the instant pitch of 1.06 μm) by linear or non-linear increase(s) or decrease(s) in pitch between grooves, depending on the position of each groove 26 (either perpendicular to or in the direction of the groove 26) on the PSM (col. 6 lines 45-50). The variation in pitch between the grooves at different positions across the PSM is also expressly described to correspond with changes in widths of the grooves (col. 5 lines 7-12, which reads on the instant plurality of grooves having a duty ratio adjusted according to the positions of the grooves by adjusting the respective spacing between the grooves and/or the respective widths of the grooves). The method of manufacturing the phase mask (PSM) is shown in Figures 6(a)-6(h), which are very similar to instant Figures 2A-2I, and includes forming a chromium (Cr) film on a quartz substrate, patterning a resist on the Cr by multiple exposures with electron beams (*instant claims 8 and 10*), dry etching the Cr through the resist pattern using a CH_2Cl_2 gas, then etching the quartz substrate through the resist and Cr patterns to an exact depth in the range of 200-400 nm by controlling etching time using a CF_4 gas, and removing the remaining resist, as well as removing all of the remaining Cr to form a completed phase mask 21 having grooves 26 in the

Art Unit: 1756

quartz substrate 11 (as shown in Figure 6(h) without any Cr remaining thereon, col. 7 line 44 to col. 8 line 37, which reads on *instant claim 1* for a phase mask having a pattern of a plurality of grooves in which the pattern is entirely transparent and *instant claim 7* for a corresponding method of making such a phase mask, as well as reading on the instant PSM groove depth of 250nm and reading on the instant PSM groove duty ratio adjusted according to positions of the grooves by adjusting the respective depths of the grooves).

Segawa et al. '495 do not specifically teach a single constant pitch for the phase mask (PSM) grooves at varying duty ratios.

However, Inoue et al. Figures 12A and 12B show that a mask having a single constant pitch across lines and spaces (lands and grooves) at varying duty ratios (col. 9 lines 15-34) was known at the time of the instant invention.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the phase mask (PSM) having an entirely transparent pattern of a plurality of grooves in a transparent substrate at varied pitch, each of the grooves having a duty ratio dependent on a position of the respective groove on the mask and the corresponding method of manufacturing it taught by Segawa et al. '495 by changing the phase mask (PSM) grooves to a single constant pitch while still varying the duty ratios, because this is a known configuration shown by Inoue et al. The resulting phase mask (PSM) would have the same structural limitations as instantly claimed and the method of manufacturing it would have the same steps as instantly claimed. Therefore, the phase mask (PSM) and method of making it taught by Segawa et al. '495 and Inoue et al. are inherently capable of being used for patterning a diffraction

Art Unit: 1756

grating in an optical guide, an optical waveguide, or an optical fiber (e.g., having a discontinuously changing period, etc., *instant claims 1, 4-8, and 10-12*).

Claims 1, 4-8, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurihara et al. (EP-936505 A1) in view of Maisenhoelder et al. (US 2002/0076154) and further in view of Inoue et al. (US 6,251,544).

Kurihara et al. teach a method of making a phase mask (phase shift mask, PSM) for patterning a Bragg diffraction grating in an optical fiber (title, which also reads on an optical waveguide or an optical guide, *instant claims 5, 6, 11, and 12*). The phase mask (PSM) parallel groove pitch is usually in the range of 0.85-1.25 μm ([0017], which encompasses the instant pitch of 1.06 μm). The method of manufacturing the phase mask (PSM) is shown in Figures 4(a)-4(h), which are very similar to instant Figures 2A-2I. The method includes forming a chromium (Cr) film on a quartz substrate, patterning a resist on the Cr by multiple exposures with electron beams or alternatively with laser light ([0016, 0037], *instant claim 10*), dry etching the Cr through the resist pattern using a CH_2Cl_2 gas, then etching the quartz substrate through the resist and Cr patterns to a depth in the range of 200-400 nm by specifically controlling etching time using a CF_4 gas, and removing the remaining resist, as well as removing all of the remaining Cr to form a completed phase mask 21 having grooves 26 in the quartz substrate 11 (as shown in Figure 4(h) without any Cr remaining thereon, [0027-0034], which reads on *instant claim 1* for a phase mask having a pattern of a plurality of grooves in which the pattern is entirely transparent and *instant claim 7* for a corresponding method of making such a phase mask having a plurality of grooves in which the pattern is entirely transparent, as well as reading on the instant PSM groove depth of 250 nm).

While teaching a phase mask (PSM) having very similar structural limitations and a method of manufacturing a phase mask (PSM) having very similar steps as instantly claimed, Kurihara et al. do not specifically teach a single constant pitch of the grooves while varying the duty ratio of the grooves according to the positions of the grooves on the mask (*instant claims 1, 7-8, and 10-12*) [1]; in which the PSM is *intended for* forming a diffraction grating having a discontinuously changing period (*instant claim 4*) [2].

Maisenhoelder et al. teach a waveguide plate and a process for making the waveguide plate (title, abstract). The waveguide plate is made by patterning through a phase mask (phase shift mask, PSM) 14 made by forming a diffraction grating having parallel grooves in a quartz substrate 15, as shown by Figures 7a-7g. The process of making the PSM diffraction grating includes etching the quartz substrate 15 through a resist pattern 16, removing remaining resist to form a diffraction grating pattern of parallel grooves in the PSM substrate 15, covering with chromium (Cr) 17, etching Cr 17 through a second resist 18 patterned by electron or laser beams, and removing the residual second resist 18 to complete the phase mask (PSM) 14 [0148-0149]). A waveguide coupler 23 (shown in Figure 10) having a coupling grating 3 (shown in Figures 8a and 8b) with a constant grating period [0157-0158] is made by a phase mask (PSM) having an appropriately (e.g., linearly, etc.) varying grating pattern (e.g., of parallel grooves, etc.) [0164]. The transmissivity of the coupler 23 is a sensitive function of the wavelength and the grating period, which vary depending on position [0166]. The phase mask (PSM) grating pattern is adjusted by changing the groove-to-land ratio (reading on the instantly defined “duty ratio”) and the grating or groove depth, which are both readily calculated with the aid of known programs [0172].

Art Unit: 1756

The teachings of Inoue et al. are discussed above.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the phase mask (PSM) having an entirely transparent pattern and the method of manufacturing such a phase mask (PSM) for patterning a diffraction grating in an optical fiber (or an optical waveguide or an optical guide) taught by Kurihara et al. by changing the phase mask (PSM) groove-to-land ratio (or duty ratio of the grooves) according to the positions of the grooves on the mask [1]; in which the PSM is *intended for* forming a diffraction grating having a discontinuously changing period [2]. This is because Maisenhoelder et al. teach that a phase mask (PSM) grating pattern (*intended for* forming a waveguide plate or diffraction grating) was known at the time of the invention to be readily adjusted by changing the groove-to-land ratio (reading on the instantly defined “duty ratio” of the grooves) and the grating or groove depth of the phase mask (PSM) grating pattern. Since Maisenhoelder et al. teach that a waveguide with a constant grating period is made by patterning through a phase mask (PSM) having a linearly varying grating pattern, one of ordinary skill in the art would reasonably expect a waveguide or diffraction grating having a discontinuously changing period to be obtained by patterning through an appropriately structured phase mask (PSM) (e.g., having a grating pattern of parallel grooves at varying duty ratio as taught by Maisenhoelder even while still having a single constant pitch as a known combination of mask features taught by Inoue et al., etc.).

Double Patenting

New nonstatutory obviousness-type double patenting (ODP) rejections are presented below.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

Art Unit: 1756

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 7-8 and 10-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, and 7-9 of U.S. Patent No. 6,795,614 (Segawa et al. '614) in view of Segawa et al. (US 6,214,495, as discussed above) and Inoue et al. (US 6,251,544, as discussed above). The conflicting claims of Segawa et al. '614 are not identical to the instant claims, at least because the Segawa et al. '614 patent claims recite a method of making a phase mask (PSM) to produce a repeating diffraction grating pattern in an optical fiber, in which the PSM has a transparent substrate with a pattern of grating shaped grooves and strips on one surface thereof that form patterns with varying groove pitch (0.85 μm to 1.25 μm) according to groove positions on the PSM, the groove to strip width ratio is uniform, and the grooves are patterned on the PSM by either an electron beam writing system or a laser beam writing system (apparently the PSM groove pattern is entirely transparent as shown in Fig 4(h)); whereas the instant claims require a method of making a PSM having an entirely transparent

Art Unit: 1756

pattern of grooves at a single pitch with varying duty ratio by varying groove widths depending on groove positions on the PSM, in which the PSM is intended for forming a diffraction grating in an optical medium, optical guide, or an optical fiber. The Segawa et al. '614 patent claims also do not specifically recite other instantly claimed limitations that are taught by Segawa et al. '495 and Inoue et al.

However, it would still have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of making a phase mask (PSM) having an entirely transparent pattern of a plurality of grooves at varied pitch in a transparent substrate, each of the grooves having a duty ratio dependent on a position of the respective groove on the mask taught by Segawa et al. '614 by changing the phase mask (PSM) grooves to a single constant pitch while still varying the duty ratio, because this is a known configuration shown by Segawa et al. '495 in combination with Inoue et al. The method of manufacturing the phase mask (PSM) would have the same steps as instantly claimed and the resulting PSM would have the same structural limitations as the instant phase mask. Therefore, the phase mask (PSM) made by the method taught by Segawa et al. '614, Segawa et al. '495, and Inoue et al. is inherently capable of being used for patterning a diffraction grating in an optical guide, an optical waveguide, or an optical fiber (e.g., having a discontinuously changing period, etc., *instant claims 7-8 and 10-12*).

Claims 7-8 and 10-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, and 7-9 of U.S. Patent No. 6,795,614 (Segawa et al. '614) in view of Kurihara et al. (EP-936505 A1, as discussed above), Maisenhoelder et al. (US 2002/0076154, as discussed above), and Inoue et al. (US 6,251,544, as discussed above). The conflicting claims of Segawa et al. '614 are not identical to the instant claims, at least

Art Unit: 1756

because the Segawa et al. '614 patent claims recite a method of making a phase mask (PSM) to produce a repeating diffraction grating pattern in an optical fiber, in which the PSM has a transparent substrate with a pattern of grating shaped grooves and strips on one surface thereof that form patterns with varying groove pitch ($0.85\text{ }\mu\text{m}$ to $1.25\text{ }\mu\text{m}$) according to groove positions on the PSM, the groove to strip width ratio is uniform, and the grooves are patterned on the PSM by either an electron beam writing system or a laser beam writing system (apparently the PSM groove pattern is entirely transparent as shown in Fig 4(h)); whereas the instant claims require a method of making a PSM having an entirely transparent pattern of grooves at a single pitch with varying duty ratio by varying groove widths depending on groove positions on the PSM, in which the PSM is intended for forming a diffraction grating in an optical medium, optical guide, or an optical fiber. The Segawa et al. '614 patent claims also do not specifically recite other instantly claimed limitations that are taught by Kurihara et al., Maisenhoelder et al., and Inoue et al.

However, it would still have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of making a phase mask (PSM) having an entirely transparent pattern for patterning a diffraction grating in an optical fiber (or an optical waveguide or an optical guide) taught by Segawa et al. '614 by changing the phase mask (PSM) groove-to-land ratio (or duty ratio of the grooves) according to the positions of the grooves on the mask; in which the PSM is *intended for* forming a diffraction grating having a discontinuously changing period. This is because Kurihara et al. in combination with Maisenhoelder et al. teach that a phase mask (PSM) grating pattern (*intended for* forming a waveguide plate or diffraction grating) was known at the time of the invention to be readily adjusted by changing the groove-to-

Art Unit: 1756

land ratio (reading on the instantly defined “duty ratio” of the grooves) and the grating or groove depth of the phase mask (PSM) grating pattern. Since Maisenhoelder et al. teach that a waveguide with a constant grating period is made by patterning through a phase mask (PSM) having a linearly varying grating pattern, one of ordinary skill in the art would reasonably expect a waveguide or diffraction grating having a discontinuously changing period to be obtained by patterning through an appropriately structured phase mask (PSM) (e.g., having a grating pattern of parallel grooves at varying duty ratio as taught by Maisenhoelder even while still having a single constant pitch as a known combination of mask features taught by Inoue et al., etc.).

Response to Arguments

Applicants' currently entered amendments and accompanying arguments with respect to claims 1, 4-8, and 10-12 have been fully considered, but they are either moot or unpersuasive in view of the new and maintained ground(s) of rejection (in which revisions to the maintained grounds of rejection emphasize some portions thereof, as necessitated by the currently entered amendment).

On pages 9-10 of the currently entered amendment, Applicants assert that Segawa et al. '495 do not teach or even suggest varying the width of grooves on a phase mask or PSM depending on the position of these grooves. However, Segawa et al. '495 expressly teach changes in widths of the grooves on the PSM that correspond to the variation in pitch between the grooves at different positions across the PSM (col. 5 lines 7-12), as indicated above.

Throughout the remarks on pages 9-13 of the currently entered submission, Applicants also rely on the currently entered amendment of claims 1 and 7 to now require that the instant phase mask has an entirely transparent pattern of grooves thereon and that the corresponding

Art Unit: 1756

instant method of making a phase mask now includes an entirely transparent pattern thereon. However, the Segawa et al. '495 phase mask shown in Figure 6(h) (col. 8 lines 34-37) and the Kurihara et al. phase mask shown in Figure 4(h) [0034] each clearly illustrate a phase mask having an entirely transparent pattern of grooves on a transparent quartz substrate, as set forth above. Therefore, Applicants' arguments in this regard are entirely unpersuasive.

In response to Applicants' argument on page 12 that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the teachings relied upon in the rejections set forth above come from knowledge that was within the level of ordinary skill at the time of the claimed invention, as exemplified by the cited references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1756

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jsr

A handwritten signature in black ink, appearing to read 'S. Rosasco', is written over a printed name and title.

**S. ROSASCO
PRIMARY EXAMINER
GROUP 1500**